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A report of research designed to investigate various aspects of acceleration and year-round education at the University of Pittsburgh following the initiation of the trimester plan. Compares the academic achievement of liberal arts students who completed their baccalaureate requirements within the conventional period with those who took either more or less than the usual time to complete their education. The academic achievement of these three groups of students (traditional, accelerated, and decelerated) was measured by performance on the Graduate Record Area Examinations during sophomore and senior years and by final quality point average.

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MEASUREMENT OF ACADEMIC ACHIEVEMENT AND PERFORMANCE OF ACCELERATED, TRADITIONAL, AND DECELERATED ATTENDERS AT THE UNIVERSITY OF PITTSBURGH

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ABSTRACT

A vital concern of any educational institution is the outcome of its educational program. The relationship between the outcomes of the educational program and the amount of time spent in completing the program is frequently questioned. This is basically a concern with the effects of educational acceleration.

Since the institution of the trimester calendar and the opportunity for students to choose voluntarily to complete their education in less than the conventional amount of time, the University of Pittsburgh has been particularly interested in the effects of educational acceleration.

A program of research designed to investigate various aspects of acceleration and year 'round education has been in operation at the University of Pittsburgh since the inauguration of the trimester plan. This present study was designed to compare the academic achievement of Liberal Arts students who completed their baccalaureate requirements within the conventional period of time with those who took either more orless time than usual to complete their education. It is an investigation of the relationship between educational outcome and acceleration rate.

Three groups (accelerated, traditional, and decelerated attenders) were defined on the basis of the number of weeks from matriculation to graduation. The academic achievement of these groups as measured by performance on the Graduate Record Area Examinations (GRE) during the sophomore and senior years and by final quality point average (QPA) was investigated.

The basic conclusion that can be reached from analysis of the results is that voluntary accelerated attendance does not jeopardize, and indeed may enhance, the final outcomes of the liberal arts education at the University of Pittsburgh. Academic achievement of University of Pittsburgh Liberal Arts students who accelerated their college education was equal to or better than the achievement of students who attended in a traditional manner. The mean final QPA and average GRE scores for the traditional and accelerated attenders were not significantly different; however, the achievement measures for both these groups were consistently higher than the measures for the decelerate group.

The results of this study have particular significance for the University of Pittsburgh in its attempts to evaluate the effects of the trimester system. It has shown that University of Pittsburgh Liberal Arts students who have taken less than the traditional four years to complete their baccalaureate degree have the following academic characteristics: (1) earn QPA's equal to or better than traditional attenders; (2) perform as well as or better than traditional attenders on sophomore and senior achievement tests; and (3) show the same magnitude and pattern of sophomore to senior academic growth on standard achievement tests as traditional attenders.

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INTRODUCTION

Since the institution of the trimester calendar system in September, 1959, the University of Pittsburgh has been particularly interested in the problems and results of educational acceleration. The trimester system which provides for three 15-week terms per academic year, each term being equivalent to the traditional semester, enables a student to choose voluntarily to attend school on a year 'round basis. It is thus possible for a student to complete a conventional eight-term, four-year college edcuation in two and two-thirds years by attending eight consecutive trimesters. Such a year 'round calendar under which students may select their pattern of attendance presents a natural situation for the study of educational acceleration.

A program of research into the trimester system and the resulting educational acceleration was inaugurated at the University when trimester operation began. A number of studies concerned with the characteristics and attitudes of students choosing to attend college on a year 'round basis have been conducted. This area of research has revealed a number of significant relationships, and study in the area is continuing.

Another and very vital field of concern in educational acceleration involves the final outcomes of accelerated education. Are the outcomes of an accelerated educational program requiring as little as two and two-thirds years comparable with the outcomes of a traditional four-year program? Does movement or progression through an educational program in less than the traditional time jeopardize the final outcomes of the educational program?

The answers to these questions are basic to the general evaluation of educational acceleration and to the evaluation of a trimester calendar.

Previous investigations of educational acceleration, such as studies by S. L. Pressey (1949), have produced evidence that accelerated attendance yields a higher level of academic achievement than traditional attendance. The generalization of the Pressey results is limited, however, because the research was based on guided acceleration of wartime students selected because of their superior academic aptitude. The students in Pressey's studies also received far more extensive counseling and guidance throughout their educational program than is usual.

In contrast to the Pressey studies, the trimester calendar at the University of Pittsburgh is suited to the study of the academic achievement of students who voluntarily choose to accelerate their education. Students who attend on a year 'round basis are not selected because of their ability nor do they receive special guidance and counseling. In a study of freshmen at the University of Pittsburgh, (Ferguson, Wedekind, and Jervis, 1961), it was reported that the academic performance (as measured by the final quality point average) of students attending two terms does not differ significantly from those attending three terms, except for men in the School of the Liberal Arts. Liberal Arts men who attended all three trimesters showed higher academic performance than those who attended only two terms.

It is the purpose of this study to examine and compare the academic achievement of students taking different lengths of time to complete their undergraduate education. An attempt will be made to answer the question

raised earlier in the paper--does a reduction in the length of time spent in completing the educational program jeopardize the final outcomes of that program?

METHOD

The basic procedure for the study was first to identify several measures of academic achievement and then to compare the performance of several groups of University of Pittsburgh students defined in terms of the time they utilized in completing their baccalaureate degree.

Measures of Academic Achievement

The measures of academic achievement selected for study were final quality point average (QPA), based on a four-point system of grading, and performance on the Area Tests of the Graduate Record Examinations (GRE).

Quality point average is the most widely used measure of academic success. Although the QPA does not tell how much the student has learned, it does give an indication of the relative level at which the student performed within the institutional system.

The Area Tests of the Graduate Record Examination prepared by Educational Testing Service are standardized measures of a student's knowledge of basic concepts and his ability to apply these concepts to the interpretation of a variety of materials. The tests were constructed not as a sample of the details of specific courses, but as a comprehensive appraisal of the outcomes of a liberal arts education. The Area Tests consist of an examination in each of three areas--Humanities, Social Sciences, and Natural Sciences. (The Graduate Record Examinations, Handbook for Deans and Examiners, 1961-62).

The testing materials were supplied to the institution by Educational Testing Service (ETS). Upon completion of the testing program, all materials were returned to ETS, where the tests were scored. The report of the test results sent to the institution included an alphabetic roster of the scores of all students tested, three copies of an individual score report for each student, and a summary data sheet of the distribution and mean for each test administered.

At the University of Pittsburgh, the Area Tests were administered to students in the School of the Liberal Arts during the second term of the sophomore year and again during the second term of the senior year.

Subjects

Rosters of all administrations of the GRE Area Tests at the University of Pittsburgh from 1956-57 through spring, 1962, were obtained. Students who had taken the tests in both their sophomore and senior years were selected as subjects for the study. The total number of subjects thus selected was 611. The subjects were then subdivided by sex, major area, and acceleration rate. The major areas were determined on the basis of the division of study into which their particular major subject fell--Humanities, Social Sciences, or Natural Sciences.

For the purposes of this study, acceleration rates were assigned in terms of the time from matriculation to graduation. On the basis of the number of weeks from date of first attendance to last attendance, three rather broad acceleration groups were defined--accelerates, traditional attenders, and decelerates. The traditional attenders were those students who

completed their undergraduate education in the conventional length of time; that is, they entered in the fall and graduated in the spring of the fourth year. It was found that such a pattern of attendance takes between 180 and 195 weeks. The traditional attender was therefore defined as a student who spent 180-195 weeks in completing his baccalaureate degree. Students taking less than 180 weeks to complete their education were called accelerates. Students taking more than 195 weeks were called decelerates.

Table 1 shows the number of subjects by sex, major area, and acceleration rate. It should be noted that the number of accelerate students is rather small. The reason for this is that the trimester system is still very new at the University. The opportunity for acceleration was limited before September, 1959, to attendance in summer programs and carrying heavy credit loads.

TABLE I

Subjects by Sex, Major Area, and Acceleration Group

	Humanities Majors	Nat. Sci. Majors	Soc. Sci. Majors	Total
Accelerates				
Men	9	32	16	57
Women	15	10	6	31
Total	24	42	22	88
Traditionals				
Men	44	163	67	274
Women	52	47	23	122
Total	96	210	90	396
Decelerates				
Men	19	49	38	106
Women	9	11	1	21
Total	28	60	39	127
Total				
Men	72	244	121	437
Women	76	68	30	174
Total	148	312	151	611

Data Collection and Analysis

The following data were obtained for each subject: GRE Area Test scores, quality point average, major area of study, high school standing in fifths, Scholastic Aptitude Test scores, total credits completed, and pattern of attendance. Progression rates in terms of weeks from first attendance to last attendance, average credit load per week in attendance, and weeks in attendance compared with weeks available for attendance were computed for each subject.

Means and standard deviations were obtained for the six GRE tests and for the final QPA for each of the groups, subdivided by major area and sex. Means and standard deviations were also obtained on the limited sample of SAT scores and class ranks. Chi-square analyses of expected distribution compared to obtained distribution were made between sex and major area, sex and acceleration group, and major area and acceleration group. The facilities of the University Computation and Data Processing Center were used for the statistical analyses.

RESULTS

In addition to a statement about the results of the several chi-square analyses, this section will contain a description of the performance of each subgroup plus comparisons of performance between men and women, major area groups, and acceleration groups. Statistical tests of the significance of difference will be made where indicated. Observed patterns of performance will be noted.

The chi-square analysis between major area of study and sex revealed a highly significant relationship ($p < .001$). Significantly more women than expected on the basis of chance are enrolled in the Humanities; more men than expected are enrolled in the Social Sciences and Natural Sciences. The relationship between acceleration group and sex was also significant ($p < .01$). There were more women in the accelerate group and more men in the decelerate group than could be expected on the basis of a chance distribution. The proportions of men and women in the normal group were not different from a chance distribution. The relationship between major area and acceleration group, as tested by the chi-square technique, was found to be not significant.

Scholastic Aptitude Test Performance

Of the total sample of 611 students for whom both sophomore and senior GRE scores were available, Scholastic Aptitude Test scores, verbal and math (SAT-V and SAT-M), were available for 119 students. The means and standard deviations for these test scores are presented in Table 2.

TABLE 2
Mean Scholastic Aptitude Test Performance

	SAT-V		SAT-M		
	Mean	S.D.	Mean	S.D.	N
Accelerates	515	79.99	564	95.10	44
Traditionals	527	82.65	533	93.72	65
Decelerates	489	103.65	512	89.52	10
Total	519	84.33	543	95.44	119

F tests for homogeneity of variance were made for SAT-V and SAT-M data. Results were not significant. Differences between mean performance of the

three acceleration groups were also nonsignificant. This is consistent with the result reported by Ferguson, et al. (1961), that there were no significant differences in performance on SAT-V and SAT-M between students attending three terms a year versus those attending only two.

It is interesting to note, however, that traditional attenders had better SAT-V performance than either decelerates or accelerates, while accelerated attenders had superior SAT-M performance.

It should be pointed out that the data for the decelerate group was based on an N of only 10. Scholastic Aptitude Tests have been a required portion of admission criteria at the University of Pittsburgh for only four years. For this reason, scores on students entering the University prior to fall, 1958, are very limited.

High School Standing

High school rank in fifths as a measure of scholastic aptitude was available for 528 subjects. The means and standard deviations of class rank are presented in Table 3.

TABLE 3
Mean High School Rank*

	Mean	S.D.	N
Accelerates	4.47	.961	73
Traditionals	4.47	.860	358
Decelerates	3.88	1.380	97

*5 indicates top fifth; 4 indicates next to top fifth; etc.

F tests for homogeneity of variance were significant for the accelerate compared to decelerates, and traditionals compared to decelerates, but not for

accelerates compared to traditional attenders. There was no difference between the mean rank of accelerates and traditionals, but both of these groups had a significantly higher mean rank than the decelerate group. ($t = 3.29$ with 168 df and 4.02 with 453 df respectively. $p < .01$)

Graduate Record Examinations

Performance on the sophomore and senior administrations of the Graduate Record Examinations was investigated for each acceleration group by sex and major area of study. A separate section will be devoted to the discussion of the results for each acceleration group and for the total group. Tables of difference scores will be presented for each subgroup. These difference scores express the difference between the mean score of each subgroup and the overall mean score of all subjects on all tests. These scores as deviations from a common base make possible comparisons between performance of men and women, sophomores and seniors, the three major areas, and three acceleration groups on the GRE Area Tests.

1. Accelerated Attenders

Humanities Majors

	Sophomore GRE			Senior GRE		
	Men	Women	Total	Men	Women	Total
Social Sci.	+34.3	-16.8	+ 2.4	+93.8	- 7.5	+30.3
Humanities	+47.6	+ 2.6	+19.4	+75.4	+67.2	+70.3
Natural Sci.	+54.3	-16.8	+ 3.6	+70.9	-47.5	- 3.1

Men scored higher than women on all tests. The highest mean sophomore score for men was Natural Sciences. The highest mean sophomore score for women was Humanities. The highest mean senior score for men was Social Sciences; the highest mean senior score for women was Humanities. Men showed greatest growth between sophomore and senior administrations on the Social Sciences Area test; women showed greatest growth in the Humanities.

Natural Science Majors

	Sophomore GRE			Senior GRE		
	Men	Women	Total	Men	Women	Total
Social Sci.	-11.8	-31.8	-16.6	+32.6	+ 7.2	+26.5
Humanities	-46.2	-31.8	-42.8	-20.6	+15.2	-12.0
Natural Sci.	+77.3	+39.2	+68.2	+115.7	+56.2	+101.5

Men scored higher than women on all but the Humanities Area tests. The highest mean sophomore and senior score for both men and women was the Natural Science test. Men showed greatest gain in the Social Sciences, while women gained most in the Humanities area.

Social Science Majors

	Sophomore GRE			Senior GRE		
	Men	Women	Total	Men	Women	Total
Social Sci.	- 3.0	-38.5	-12.7	+45.1	+ 4.9	+34.1
Humanities	-24.9	-53.5	-32.7	- 4.9	-18.5	- 8.6
Natural Sci.	-13.0	-50.1	-23.2	- 8.7	-38.5	-16.8

Men had higher mean scores than women on all tests. The highest sophomore and senior mean scores for men and women were in the Social Sciences area. Both men and women showed greatest growth in the Social Sciences.

Total Accelerates

	Sophomore GRE			Senior GRE		
	Men	Women	Total	Men	Women	Total
Social Sci.	- 2.1	-25.8	-10.4	+45.7	- .4	+29.4
Humanities	-25.4	-19.4	-23.3	- 1.0	+33.8	+11.3
Natural Sci.	+48.3	-10.0	+27.8	+73.7	-12.3	+43.4

Considering the total accelerate group, regardless of major area, it was found that men had higher mean scores than women on all but the Humanities tests. The highest sophomore score for men and women was in the Natural Sciences area. The highest senior score for men was Natural Sciences, but the highest for women was Humanities. The results are consistent with previously reported relationships between sex and major.

As sophomores, Humanities majors had the highest mean Social Sciences and Humanities scores; Natural Sciences majors had the highest mean Natural Sciences score. As seniors, however, each major group had the highest mean score for its particular major area. Social Sciences majors showed greatest growth

i.. the Social Sciences, plus substantial increase in the Humanities. Humanities majors showed greatest growth in the Humanities and substantial growth in the Social Sciences. The area of greatest increase for Natural Sciences majors was Social Sciences; in addition, they showed a substantial increase in both the Humanities and the Natural Sciences.

2. Traditional Attenders

Humanities Majors

	Sophomore GRE			Senior GRE		
	Men	Women	Total	Men	Women	Total
Social Sci.	-34.8	-23.9	-28.9	+ 2.3	- .1	+ 1.0
Humanities	-22.0	+10.2	- 4.6	+27.1	+48.8	+38.8
Natural Sci.	-17.9	-32.0	-25.6	+ 2.1	-25.1	-12.6

The highest sophomore performance for men was on the Natural Sciences test; the highest for women was the Humanities test. The highest performance area for senior men and women was the Humanities. Both men and women showed greatest sophomore to senior gain in the Humanities area.

Natural Sciences Majors

	Sophomore GRE			Senior GRE		
	Men	Women	Total	Men	Women	Total
Social Sci.	-40.3	-59.6	-44.6	+15.1	-27.9	+ 5.5
Humanities	-49.6	-21.7	-43.4	-12.6	+ 4.3	-8.8
Natural Sci.	+75.3	+33.2	+65.9	+95.0	+55.3	+86.1

Men had higher performance than women on all tests except Humanities. The highest mean score for men and women, sophomore and senior, was the Natural Sciences Area test. Both men and women had greatest increase in the Social Sciences area.

Social Sciences Majors

	Sophomore GRE			Senior GRE		
	Men	Women	Total	Men	Women	Total
Social Sci.	+ 5.1	- 4.6	+ 2.6	+54.1	+41.0	+50.8
Humanities	-22.8	- 8.5	-19.1	- 4.3	+27.1	+ 3.8
Natural Sci.	-11.9	-24.2	-15.0	+4.8	-21.6	- 1.9

The mean scores for men on all tests except Humanities Area test exceeded those for women. The highest sophomore and senior score for men and women was in the Social Sciences. The growth between sophomore and senior years was greatest for men and women in the Social Sciences area; women also showed considerable increase in the Humanities.

Total Traditional Attenders

	Sophomore GRE			Senior GRE		
	Men	Women	Total	Men	Women	Total
Social Sci.	-28.3	-34.0	-30.1	+22.6	- 3.0	+14.7
Humanities	-38.6	- 5.7	-28.5	- 4.2	+27.5	+ 5.6
Natural Sci.	+39.0	- 5.4	+25.3	+58.0	+ 6.6	+42.2

For the total group of traditional attenders, it was found that men had higher mean scores than women on all tests except Humanities. The highest sophomore and senior mean scores for men were in the Natural Sciences are. Sophomore women achieved equal performance in the Humanities and Natural Sciences, but senior women showed greatest achievement in the Humanities. Men showed greatest growth in the Social Sciences with a substantial increase in the Humanities. Sophomore to senior increases for women were equal in the

Social Sciences and Humanities. As both sophomores and seniors, each major area group received the highest mean score in its particular field. Humanities majors had greatest sophomore to senior increase in the Humanities area plus a substantial increase in the Social Sciences. Social Sciences majors showed greatest increase in the Social Sciences with a substantial increase in the Humanities. The greatest sophomore to senior increase for Natural Sciences majors was in the area of the Social Sciences; substantial increases were also made in the Humanities and Natural Sciences areas.

3. Decelerates

Humanities Majors

	Sophomore GRE			Senior GRE		
	Men	Women	Total	Men	Women	Total
Social Sci.	-64.7	+ 5.4	-42.2	-41.0	+ 7.6	-25.4
Humanities	-54.2	+51.0	-20.4	-31.0	+74.3	+ 2.8
Natural Sci.	-44.7	-21.2	-37.2	-41.5	+ 4.3	-26.8

The performance of women was superior to that of men on all tests. The highest sophomore score for men was Natural Sciences; the highest for women was Humanities. Between sophomore and senior administrations of the GRE area tests men showed equal growth in the Social Sciences and Humanities; women showed equal growth in the Humanities and Natural Sciences areas.

Natural Sciences Majors

	Sophomore GRE			Senior GRE		
	Men	Women	Total	Men	Women	Total
Social Sci.	-69.0	-60.4	-67.5	-29.4	-14.1	-26.6
Humanities	-65.8	+10.5	-51.8	-48.6	+19.6	-36.1
Natural Sci.	+39.5	+25.0	+36.9	+81.4	+43.2	+74.4

Women had higher mean scores than men on all tests except the Natural Sciences Area test. The highest area of achievement for men and women on both sophomore and senior administrations of the GRE was in the Natural Sciences. Between sophomore and senior years men showed equal growth in the Social Sciences and the Natural Sciences; women showed greatest growth on the Social Sciences Area test.

Social Sciences Majors

	Sophomore GRE			Senior GRE		
	Men	Women	Total	Men	Women	Total
Social Sci.	-61.3	+143.2	-56.0	-2.1	+173.2	+ 2.4
Humanities	-92.1	+183.2	-85.0	-69.4	+83.2	-65.5
Natural Sci.	-44.4	-116.8	-46.3	-33.1	-26.8	-33.0

Because of the very small frequency of women in this group, separate analyses by sex were not made. The highest mean sophomore score for the group was in the Natural Sciences; the highest mean senior score was in the Social Sciences. The group showed greatest sophomore to senior growth in the Social Sciences.

Total Decelerates

	Sophomore GRE			Senior GRE		
	Men	Women	Total	Men	Women	Total
Social Sci.	-65.5	-22.5	-58.4	-21.7	+ 4.2	-17.4
Humanities	-73.1	+36.1	-55.1	-52.9	+46.1	-36.6
Natural Sci.	- 5.7	- 1.6	- 5.0	+18.3	+23.2	+19.1

When the total decelerate group was examined, women were found to have scored higher than men on all tests. For both sophomore and senior administrations, men had their highest achievement in the Natural Sciences. The highest area of achievement for sophomore and senior women was the Humanities. This is again a reflection of the major area and sex relationship previously reported. Men showed greatest sophomore to senior growth in the Social Sciences; women showed equal increases in the Social and Natural Sciences areas.

As sophomores, the Humanities majors had the highest Social Sciences and Humanities scores, while Natural Sciences majors had the highest Natural Sciences score. Results of the senior year administration indicated that each major area group received the highest mean score for its particular field. Natural Sciences majors showed about equal sophomore to senior growth on the Social Sciences and Natural Sciences Area tests. Social Sciences majors had greatest gain in the Social Sciences and less, but substantial gain, in the Humanities. The Humanities majors showed substantial growth in all fields but greatest growth in the Natural Sciences area.

4. Total Sample

Humanities Majors

	Sophomore GRE			Senior GRE		
	Men	Women	Total	Men	Women	Total
Social Sci.	-34.0	-19.0	-26.3	+ 2.2	- .6	+ .8
Humanities	-21.8	+13.5	- 3.7	+17.8	+55.4	+37.1
Natural Sci.	-16.0	-29.7	-23.0	- 2.1	-26.0	-13.8

The mean scores of the accelerates were highest, followed by the traditional and then decelerate attenders. It is interesting to note, however, that the difference between the acceleration groups was a factor of the performance of men and not women. Acceleration rate does not appear to be related to achievement of women students in this subgroup. All three acceleration groups showed greatest sophomore to senior growth in the Humanities area. The increase, as expressed in point difference between mean sophomore ans senior scores, was greatest for the accelerates (51 points), compared to 43 points for the traditional group and 23 points for the decelerate attenders. Accelerates and traditional attenders also showed substantial increase in the Social Sciences (about 30 points); decelerates increased 17 points. The traditional and decelerate attenders showed a slight gain (12 points) in achievement on the Natural Sciences Area test, while accelerates showed a loss of seven points.

Natural Science Majors

	Sophomore GRE			Senior GRE		
	Men	Women	Total	Men	Women	Total
Social Sci.	-42.3	-55.6	-45.2	+ 8.5	-20.5	+ 2.1
Humanities	-52.4	-18.0	-44.9	-20.9	+ 8.4	-14.5
Natural Sci.	+68.4	+32.8	+60.6	+95.0	+53.5	+85.9

In general, the mean scores of the accelerates exceeded those of traditional and decelerate attenders. This pattern of performance was true for men and women but was more consistent for men. Women appear to be more similar in performance across the acceleration groups than men. Pointwise, the greatest sophomore to senior increase for all groups was in the Social Sciences area, with an almost equal gain of between 40 and 50 points for each group. Accelerate and traditional attenders showed a substantial increase in the Humanities area of between 30 and 35 points; decelerates showed a smaller gain of 15 points. The growth in the Natural Sciences was between 33 and 38 points for accelerates and decelerates, compared to 20 points for traditional attenders.

Social Science Majors

	Sophomore GRE			Senior GRE		
	Men	Women	Total	Men	Women	Total
Social Sci.	-16.8	- 6.5	-14.8	+35.3	+38.2	+35.8
Humanities	-44.8	-11.1	-38.1	-24.8	+19.9	-15.9
Natural Sci.	-22.3	-32.5	-24.3	- 8.9	-25.1	-12.1

The average performance of the traditional attenders was highest followed by accelerates and then decelerates. The area of greatest sophomore to senior growth for all groups was the Social Sciences. The magnitude of increase in

terms of points was about equal for traditional and accelerated attenders, but was slightly higher for decelerates. All three acceleration groups showed equal but less increase in the Humanities (20-24 points). Increase in the area of the Natural Sciences was slight for all groups.

Total Sample

	Sophomore GRE			Senior GRE		
	Men	Women	Total	Men	Women	Total
Social Sci.	-33.9	-31.2	-33.1	+14.8	- 1.7	+10.1
Humanities	-45.3	- 3.1	-33.2	-15.6	+30.9	- 2.4
Natural Sci.	+29.4	- 5.8	+19.4	+50.4	+ 5.2	+37.6

The achievement of the acceleration group was highest, followed by the traditional attenders and then the decelerate attenders. The difference between the performance of accelerates and traditionals was very slight, averaging only eight points per test. There were, however, considerable differences between the performance of accelerates and decelerates, and traditionals and decelerates. The GRE's for accelerates averaged 39 points above those of decelerates; the GRE's for traditionals averaged 31 points above those of decelerates.

A series of t tests was used to assess the significance of differences between mean performance of accelerates and decelerates, accelerates and traditionals, and traditionals and decelerates on the GRE area tests. On only one test was there a significant difference between the performance of accelerates and traditionals. Accelerates performed significantly better than traditional attenders ($p < .05$) on the sophomore administration of the Social Sciences Area test.

The performance of both accelerated and traditional attenders was found to be significantly higher ($p < .01$) than the performance of decelerates on all but the Humanities Area test. It was found on the senior administration of the Humanities Area test that there was no significant difference between the performance of accelerates and decelerates.

It should be noted that the difference between the achievements of the accelerate and other groups was to a large degree a result of the performance of men and not women. Women appeared to be more homogeneous in performance patterns, with decelerates showing slightly higher mean scores than traditionals or accelerates.

The area of greatest sophomore to senior growth for the total group was Social Sciences. The magnitude and pattern of increase for traditionals and accelerates was approximately the same--highest in the Social Sciences (40-45 points) plus substantial gain in the Humanities (35 points). Decelerates showed greatest gain in the Social Sciences (41 points), plus a substantial gain of 24 points in the Natural Sciences.

The patterns of sophomore to senior GRE growth for men and women were not the same. Men in all three groups showed greatest gain in the Social Sciences (44-51 points) with substantial increases in both the Humanities and the Natural Sciences. Women, on the other hand, showed no overall pattern. Traditional attenders showed an equal gain in Social Sciences and Humanities with little growth in Natural Sciences; decelerates showed equal gain in Social and Natural Sciences with little gain in Humanities; and accelerated attenders showed a 50-point gain in Humanities, substantial gain in Social

Sciences, and no gain in Natural Sciences. The differences found in the academic achievement of men and women were consistent with the previously reported relationships between sex, acceleration rate, and major area.

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Quality Point Average

Mean Final Quality Point Average

	Accelerates			Traditionals			Decelerates		
	Men	Women	Total	Men	Women	Total	Men	Women	Total
Humanities	3.08	3.01	3.04	2.88	3.15	3.02	2.55	2.91	2.67
Natural Sci.	2.98	2.85	2.95	2.97	3.00	2.97	2.56	2.80	2.60
Social Sci.	2.69	2.89	2.75	2.92	2.84	2.90	2.44	2.98	2.46
Total	2.92	2.94	2.92	2.94	3.03	2.97	2.52	2.85	2.57

The mean final QPA of women in all acceleration groups was higher than the QPA of men. Humanities majors in all acceleration groups earned higher QPA's than did majors in the Social Sciences or Natural Sciences. The final QPA's of Social Sciences majors were lowest. The mean final QPA's earned by students in both the accelerate and traditional attendance groups were significantly higher than the mean QPA earned by decelerate attenders ($t = 5.78$ with 213 df and 9.12 with 521 df respectively. $p < .01$). The mean QPA's of traditionals and accelerates were not different. As was true of GRE performance, differences between the final QPA's of the three acceleration groups were primarily the result of the performance of men.

SUMMARY OF RESULTS

1. More women than expected by chance major in the Humanities; more men than expected by chance major in the Natural or Social Sciences.
2. More women than expected on the basis of chance alone completed baccalaureate requirements at an accelerated rate.
3. The final mean QPA of women was higher than that of men. Humanities majors earned higher QPA's than Natural or Social Sciences majors. The final QPA of traditional and accelerated attenders was approximately equal; however, the QPA of decelerates was significantly lower than either accelerates or traditionals. The difference in QPA achievement among acceleration groups was primarily the result of the performance of men.
4. The average performance of decelerates on both pre-college SAT-V and SAT-M was considerably lower than either accelerates or traditionals. The traditional and accelerated attenders did equally well on SAT-V, but the performance of accelerates exceeded the traditionals on SAT-M.
5. No differences were found between accelerates and traditionals with respect to mean high school rank. However, the mean rank of decelerates was significantly lower than that of either accelerates or traditionals.
6. With respect to the GRE Area tests, the average performance of men was generally superior to that of women. This is opposite to the result one would expect on the basis of the relationship between sex and QPA. Only as decelerates do women perform better than men. The highest mean senior score regardless of sex or acceleration group was made in the group's major area. With only two exceptions, the highest mean sophomore score

for men regardless of major was in the Natural Sciences. The two exceptions were Social Sciences majors in decelerate and accelerate groups who received their highest mean score in the Social Sciences. Sophomore women regardless of their acceleration group received their highest score in the area of their major.

With only three exceptions, the area of greatest sophomore to senior gain for men, regardless of major, was in the Social Sciences. The exceptions to this were: (1) Humanities majors in the traditional attendance group showed greatest gain in the Humanities area test; (2) equal Social Sciences and Humanities growth was made by Humanities majors in the decelerate group; (3) equal Social Sciences and Natural Sciences growth was made by decelerate Natural Sciences majors.

Women, for the most part, also showed greatest gain in the Social Sciences, The exceptions to this were: (1) Humanities majors regardless of acceleration group, and (2) Natural Science accelerates who showed greatest gain in the Humanities. It is generally true, however, that regardless of sex, major area, or acceleration rate, the area of greatest growth between the sophomore and senior administration of the GRE was the Social Sciences.

Accelerates in general received higher mean GRE scores than traditional or declerated attenders. The difference between the performance of accelerates and traditionals was very slight, however, averaging only eight points per test. There were significant differences between the

mean scores of accelerates and decelerates and traditionals and decelerates. These differences averaged 39 and 31 points respectively, and were a factor primarily attributed to the performance of men. Women across the groups were fairly homogeneous in the achievement on the GRE. The difference between the performance of the acceleration groups was consistent for all major areas except Social Sciences. It was found here that the achievement of traditional attenders slightly exceeded that of accelerates and was considerably higher than that of decelerates.

CONCLUSIONS

The basic conclusion that can be reached from analysis of the results is that voluntary accelerated attendance does not jeopardize the final outcomes of the liberal arts education at the University of Pittsburgh. Academic achievement of liberal arts students who accelerated their college education was equal to or better than the achievement of students who attended in a traditional manner. The mean final QPA and average GRE scores for the traditional and accelerated attenders were not significantly different; however, the achievement measures for both these groups were consistently higher than the measures for the decelerate groups.

The results of the study have particular significance for the University of Pittsburgh in its attempts to evaluate the effects of the trimester system. It has shown that University of Pittsburgh School of the Liberal Arts students who have taken less than the traditional four years to complete their baccalaureate degree have the following academic characteristics: (1) earn QPA's equal to or better than the traditional attenders; (2) perform as well as or better than traditional attenders on sophomore and senior achievement tests; and (3) show the same magnitude and pattern of sophomore to senior academic growth on standard achievement tests as traditional attenders.

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